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RAA

basic imagery interpretation report

Abalakovo Phased-Array Radar Facility, USSR (S)

DEPLOYED AMM FACILITIES

USSR

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INSTALLATION OR ACTIVITY NAME		COUNTRY
Abalakovo Phased-Array Radar Facility		UR
UTM COORDINATES	GEOGRAPHIC COORDINATES	
NA	57-52-04N 093-06-57E	

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MAP REFERENCE

DMA. US Air Target Chart, Series 200, Sheet 0159-13, scale 1:200,000,
3rd Edition July 1973, SECRET/NOFORN

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ABSTRACT

1. This report provides a description and construction chronology of the Abalakovo Phased-Array Radar Facility. It compares the pace of construction at Abalakovo with other similar radars and compares the inclination angle of the face of the antennas with that of other large new-generation, phased-array radars. (S/WN)

2. The Abalakovo phased-array radar, one of five known large phased-array radars of its type, was identified in July 1983 in the Central Asian region of the USSR. When first observed, it was in the midstage of construction. A comparison of the pace of construction of this radar to others of its type suggests that it had been under construction for approximately two to two-and-one-half years. Like the other radars, the function of the Abalakovo radar is assessed to be ballistic missile early warning (BMEW). The radar could be externally complete by 1986. (S/WN)

3. This report includes five annotated photographs, one map, a table of dimensions, and one annotated line drawing. (S)

INTRODUCTION

4. The phased-array radar under construction at Abalakovo is the fifth new-generation, bistatic, phased-array radar to be identified in the Soviet Union (Figure 1). The other four are located at Pechora, Lyaki, Sary-Shagan, and Mishelevka. A sixth facility, at Olenegorsk, has a receiver antenna but no transmitter. At present, the Abalakovo radar is in the midstage of construction. Its construction status is behind that of the Sary-Shagan radar, but ahead of the radar at Mishelevka. The radars at Pechora and Lyaki are externally complete. (S/WN)

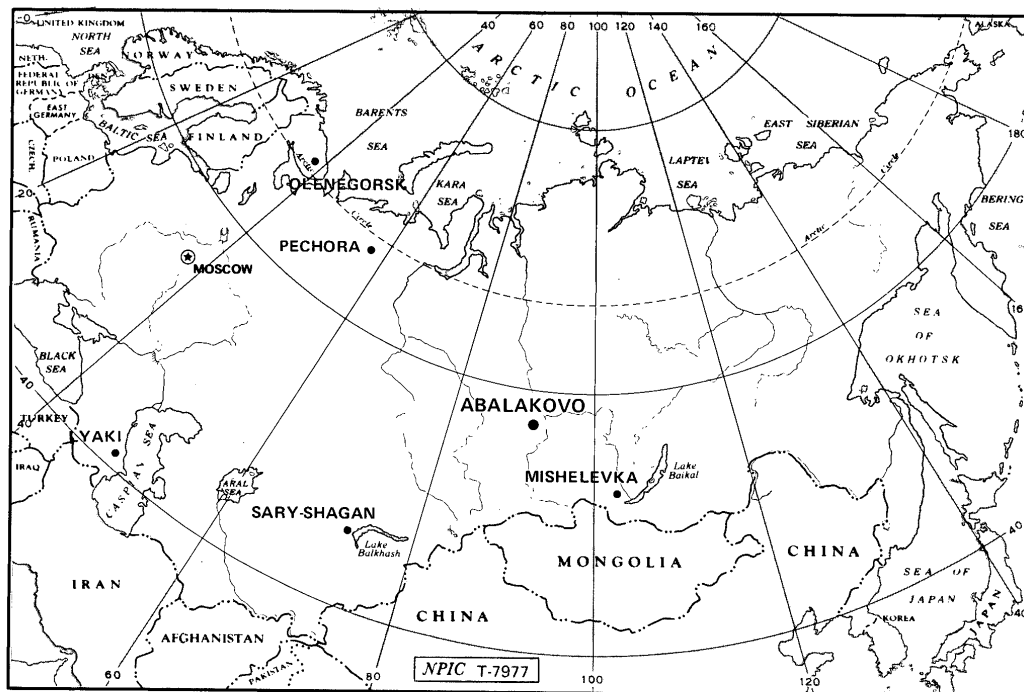


FIGURE 1. LOCATIONS OF NEW-GENERATION PHASED-ARRAY RADARS, USSR

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BASIC DESCRIPTION

5. The Abalakovo phased-array radar facility (Figure 2) is located in the Central Asian region of the USSR, approximately 760 kilometers north of the nearest national border. The 40° boresight azimuth of the radar gives it coverage of the Eastern Siberian landmass and fills in the gap in BMEW coverage of this sector. (S/WN)

6. The Abalakovo radar consists of a C-shaped transmitter building, a modified A-frame receiver building, and a support area that includes cooling facilities, storage tanks, and an electrical power substation. The center-to-center distance between the transmitter and receiver is 840 meters. (S/WN)

7. The height of the Abalakovo radar transmitter is the same as that of the Sary-Shagan radar transmitter—37 meters (Table 1). This is about two-thirds as high as the Pechora and Lyaki radar transmitters, which are 56 meters. The antenna heights of the Mishelevka radar cannot be determined at this stage of its construction. The Abalakovo transmitter has an extension 12 meters wide at the rear of the building, between the two elevator shaft housings, similar to the transmitter at Sary-Shagan. The Pechora and Lyaki transmitters do not have such an extension. In all other respects, all four radar transmitters appear similar. (S/WN)

8. The Abalakovo radar receiver is 86 meters high and 95 meters long, the same as the Sary-Shagan, Pechora, and Lyaki receivers. The atypical, receiver-only antenna at Olenegorsk is only 46 meters high. The Abalakovo receiver building differs from the other receivers, having a two-story structure built into its base and 30- by 24-meter extensions on both sides. The Pechora and Lyaki receiver buildings each have a two-story structure at their bases, 6-meter-wide extensions on both sides, and a 114- by 6-meter extension in the rear. The Sary-Shagan receiver building has a single-story structure at its base, 12-meter-wide extensions on both sides, and a two-story extension, 138 by 12 meters, in the rear. (S/WN)

9. The support facilities for the Abalakovo radar are on the southwest side of the radar antennas and will be approximately the same as those built for the Pechora radar. The electrical power substation and the transmitter cooling facility are directly behind the transmitter antenna; likewise, the receiver cooling facility is behind the receiver antenna. (S/WN)

Construction Chronology

10. When the Abalakovo transmitter building was first observed on imagery, [] the transmitter-element modules had been emplaced to about three-fourths of the height of the antenna face (Figure 3, top). The structural framework for the transmitter building had been completed, but some sections of the wall and roof had not yet been paneled. The receiver building was cloud-covered on that date. (S/WN)

11. When the receiver building was first observed [] about 90 percent of the framework structure was complete and I-beams, to which the receiver-element modules are attached, were being installed up the face of the antenna (Figure 4, top). At the transmitter building on this date (not shown), the transmitter-element modules had been emplaced to the top of the antenna face, and support structures that hold the stacked element modules in place were being installed. (S/WN)

12. When the radar facility was next imaged [] the element-module support structures were still being installed on the face of the transmitter antenna, and exterior wall panels and roof sections were being installed on the antenna building. The framework of the receiver building was complete to within one story of the top. (S/WN)

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Table 1.

Comparison of Sizes of Phased-Array Radar Transmitter and Receiver Antennas

Facility	Transmitter		Receiver		Center-to-Center Distance, Receiver to Transmitter (m)
	Length (m)	Height (m)	Length (m)	Height (m)	
Pechora Phased-Array Radar Facility	45	56	95	86	800
Lyaki Phased-Array Radar Facility	45	56	95	86	1,200
Sary-Shagan Phased-Array Radar Facility	45	37	95	86	2,700
Abalakovo Phased-Array Radar Facility	45	37	95	Ucon; appears it will be 86	840
Mishelevka Phased-Array Radar Facility	Ucon; unable to determine dimensions				870
Olenegorsk Phased-Array Radar Facility	no transmitter		95	46	—

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13. [] the element-module support structures on the transmitter antenna appeared to be completely installed and locked into place by a horizontal beam across the top. Work was still underway on the top floor of the receiver building. (S/WN)

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14. [] I-beam installation on the receiver was complete. (S/WN)

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15. [] horizontal environmental-covering panels were being installed over the top edge of the stacked element modules between the transmitter building framework and the element-module support structures (Figure 3, bottom). At the receiver, the roof was being placed over the top floor of the receiver building (Figure 4, bottom). Although the exterior wall panels had been installed on the sides of the receiver building, the back of the structure was still open to the environment. (S/WN)

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Comparison of Construction at Abalakovo with Pechora and Sary-Shagan

16. When the Abalakovo radar was first imaged, it was already in the midstage of construction. Compared with the construction of similar radars, the Abalakovo radar probably had been under construction for approximately two to two-and-one-half years. Currently, the Abalakovo radar transmitter is at about the same stage of construction as the Pechora radar transmitter was in March 1977, about two-and-one-half years after construction started at Pechora. The Sary-Shagan transmitter, which is the same size as the Abalakovo transmitter (Pechora is larger), was at approximately the same construction stage as Abalakovo in September 1982, about two years after initial ground scarring was seen at its construction site. (S/WN)

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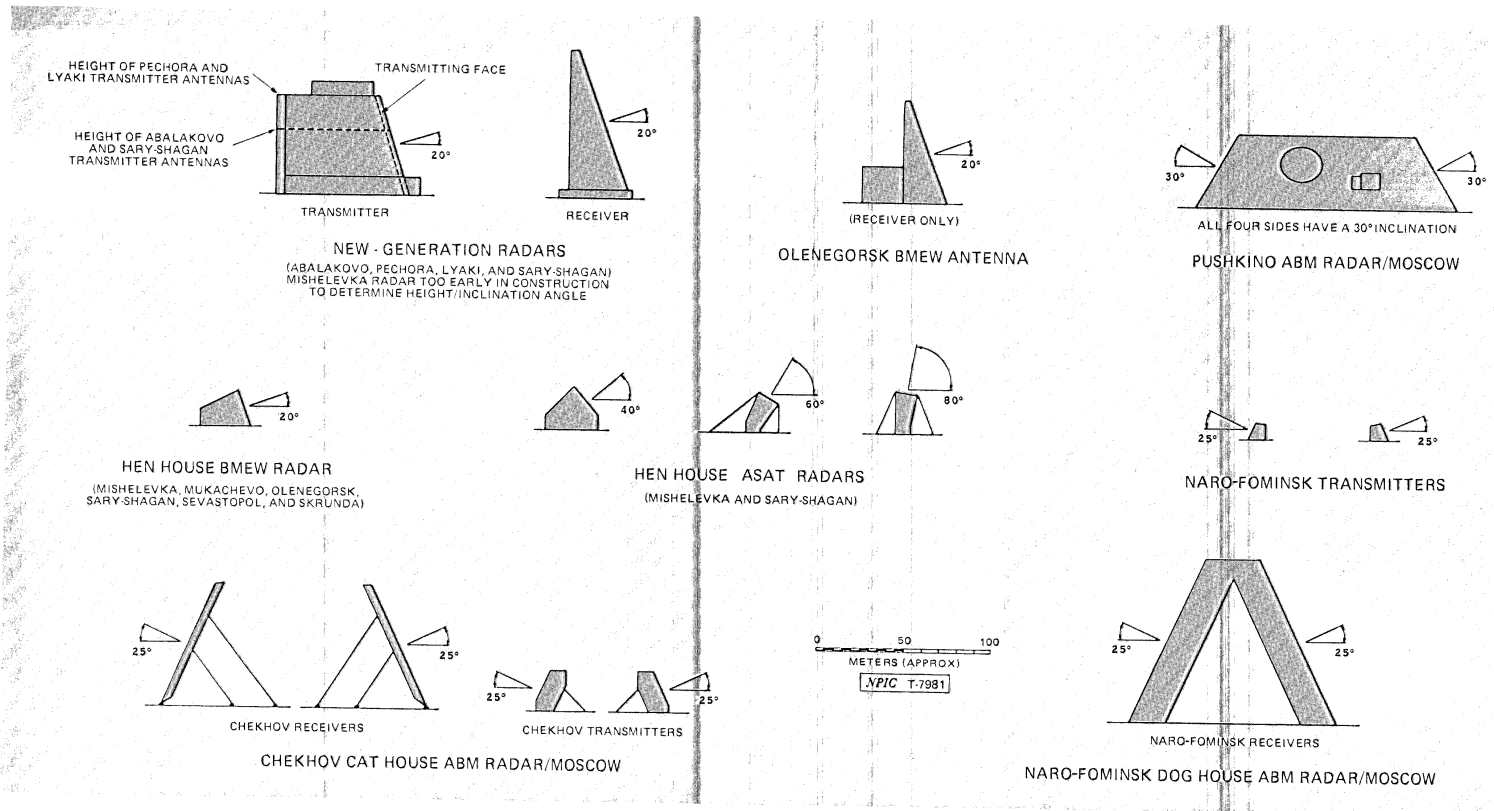


FIGURE 5. COMPARISON OF SOVIET BMEW, ASAT, AND ABM RADARS

17. Construction of the Abalakovo receiver appears to be slower than that of its predecessors. It is at about the same stage of construction as the Pechora radar receiver was between February and August 1976, 15 to 21 months after construction started. The Sary-Shagan radar receiver reached approximately the same stage of construction about one year after construction began. Thus, if construction of the Abalakovo receiver started at about the same time as the transmitter, the receiver is about 6 to 12 months behind the pace of its predecessors. (S/WN)

Comparison of Antenna Inclination Angles

18. The inclination angle of the Abalakovo radar antennas (20°) indicates that the Abalakovo radar, like its predecessors at Pechora, Lyaki, and Sary-Shagan, will be used for ballistic missile early warning (Figure 5). The Olenegorsk BMEW antenna is also inclined at 20° and, although still too early to measure, the Mishelevka radar almost certainly will be the same. (S/WN)

19. The Soviet HEN HOUSE BMEW radars also have an inclination angle of 20°, which allows them to track approaching reentry vehicles (RVs) from the horizon to about 65° above the horizon. (S/WN)

20. The other type of HEN HOUSE radar, assessed as having primarily a satellite-tracking function (ASAT), has antennas with inclination angles of 20°, 40°, 60°, and 80°, which are used in combination to provide an across-the-sky tracking capability. (S/WN)

21. Figure 5 also compares the new-generation radars with ABM radars near Moscow, at Naro-Fominsk (DOG HOUSE) and at Chekhov (CAT HOUSE). The faces of the Moscow radars, which are assessed to have a battle management function, are inclined at 25°. This angle enables the radars to

detect targets at the horizon and track them until ABM intercept radars can continue the tracking. (S/WN)

22. Figure 5 also shows an artist's concept of the large pyramid-shaped ABM phased-array radar under construction at Pushkino, just north of Moscow. This radar is believed to be intended for use as an ABM missile guidance/intercept radar. The 30° inclination angle of its four faces will allow the radar to track incoming RVs at medium to high angles, after tracking data has been handed over from the battle management radars, and to guide ABM missiles to intercept. (S/WN)

REFERENCES

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COMIREX C01
Project 544033B

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